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## **SECTION 4H OTHER IMPACT CONSIDERATIONS**

### **4H.1 UNAVOIDABLE ADVERSE IMPACTS**

This section summarizes unavoidable adverse effects that would result from construction, operation, and abandonment of the proposed action and alternatives and FFD alternatives. Unavoidable impacts are those remaining after the project has complied with applicable stipulations and mitigation measures. A detailed discussion of adverse effects and potential mitigation measures is presented for each element of the environment in Sections 4A through 4E. Adverse impacts that would occur as a result of the proposed plan or alternatives could be lessened by mitigation but would not be completely eliminated or reduced to negligible in many cases. Unavoidable adverse impacts that would affect resources in the Plan Area are described below.

#### **4H.1.1 Spills**

The proposed action or the action alternatives and FFD alternatives in the Plan Area would result in spills of produced fluids, crude or refined oil, seawater, and other chemicals. The probability of spills of a magnitude that could adversely affect resources is low. Resources that could be adversely affected by spills include vegetation, fish, birds, mammals, water resources, subsistence harvest and uses, recreation, cultural resources, and the economy.

#### **4H.1.2 Physical Environment**

##### **4H.1.2.1 Terrestrial Environment**

###### **PHYSIOGRAPHY**

Impacts to physiography could occur primarily during the construction phase and result from changes to landforms by construction of roads, pads, airstrips, and gravel mine sites.

###### **GEOLOGY**

Petroleum resources in the ASDP Area would be reduced because these resources are non-renewable. Surface and intrusive activities during construction and operation phases would affect the mechanical and thermal properties of the soil and would also modify permafrost distribution. A large amount of sand and gravel would be required for use as fill for construction of roads, pads, or airstrips. Impacts to paleontological resources could result from those activities involving subsurface disturbance such as production well drilling, sand and gravel mining, and installation of VSMs, power poles, and bridge piles.

##### **4H.1.2.2 Aquatic Environment**

###### **WATER RESOURCES**

Rivers and streams could be adversely affected when construction and operation activities associated with roads and pipelines block, divert, impede, or constrict flows, resulting in impoundment of water. Constricting flows could result in increased stream velocities and a higher potential for ice jams, ice impacts, scour, and streambank erosion. Impeded flows could result in bank overflows and floodplain inundation.

Use of fresh water for construction and operational activities would result in negligible impacts to lake-water levels because natural annual recharge processes are sufficient to fully recharge lakes.

The practice of disposing of drilling wastes and wastewater into development or disposal wells could affect specific localized deep groundwater zones. However, because groundwater below permafrost is typically saline, impacts to potable water sources are not expected.

### **SURFACE WATER QUALITY**

Potential effects on surface water quality that could occur during construction and operation include accidental release of fuels and other substances, including oil spills; reductions in dissolved oxygen and changes in ion concentrations in lakes used for water supply; and increases in terrestrial erosion and sedimentation, which would raise turbidity and suspended solids concentrations.

### **ESTUARINE WATERS AND WATER QUALITY**

HP-22 appears to be situated on relatively high ground between two thaw lakes approximately 1,500 feet from an actively eroding coastline. Proper consideration of coastal processes in siting that facility would result in negligible impacts.

#### **4H.1.2.3 Atmospheric Environment**

### **CLIMATE AND METEOROLOGY**

Operation of fossil fuel combustion equipment during construction and drilling activities would result in GHG emissions. Greenhouse gas emissions would also occur over a longer period from operations. The impact of GHG emissions on the air quality of the region would be negligible.

### **AIR RESOURCES**

Construction and operations would result in air emissions in the region. The emissions would not have a lasting effect on air quality.

### **NOISE**

Generally, the equipment in the Plan Area will operate at a decibel level of approximately 70 dBA over less than 1,000 feet. During drilling, the potential noise impacts would be limited to the vicinity of the power generation engines and drilling rig engines, which would have equipment decibel ratings of approximately 85 dBA and 110 dBA, respectively. During peak periods of construction and drilling, noise levels would be considerably higher than during operations, but would be short-term and would not occur at all proposed satellite pads at the same time.

#### **4H.1.3 Biological Resources**

##### **4H.1.3.1 Terrestrial Vegetation and Wetlands**

Placement of fill would eliminate vegetation and wetlands. Vegetation and wetlands would be altered by trenching and dust deposition.

##### **4H.1.3.2 Fish**

Increased access by road could affect winter habitat and feeding and spawning areas. Water withdrawal for ice road construction may create overcrowding and reduce dissolved oxygen in lakes, with fish mortality a possible result. Construction of ice roads or airstrips on fish overwintering areas may cause freezing to the bottom and block fish movement. Low dissolved oxygen may also result from suspension of oxygen-demanding materials during construction of bridges. If bridge approaches extend into the floodplain terrace(s), they would alter flow and block fish passage during flood stage. The long network of roads in alternatives A and C could result in alteration of regional surface hydrology, including interruption of fish movements.

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#### **4H.1.3.3 Birds**

Construction and operation would result in potential habitat loss or alteration; displacement and disturbance; obstructions to movement; and mortality. Potential nests of waterfowl and loons, shorebirds, passerines, seabirds (gulls, jaegers, and terns), and ptarmigan would be displaced by habitat loss, alteration, or disturbance. Impacts to nesting habitat for raptors and owls would be negligible.

#### **4H.1.3.4 Mammals**

Habitat for terrestrial mammals would be covered with gravel fill. Noise and human activity associated with construction, industry vehicle traffic, aircraft traffic, and activity on facilities and pipeline routes during operations may disturb caribou, moose, muskoxen, and grizzly bears in the vicinity of infrastructure. This may cause animals to move away from infrastructure (displacement). Road/pipeline combinations could delay or deflect caribou crossing, especially if traffic levels are higher than 15 vehicles per hour. If local hunting occurs on the roads, crossing may be impeded because of increased avoidance of human activity. Impacts as described are relevant to individual animals. Hunting by local residents on the oilfield roads would increase the mortality of caribou and possibly moose, muskoxen, and grizzly bears. It is unlikely these impacts would have a negative impact at the population level.

Construction of, and traffic on, bridges over rivers could cause some disturbance of spotted seals and beluga whales. Aircraft traffic in and out of the Plan Area could also disturb some marine mammals. Noise from construction and operation in winter could disturb some denning polar bears. Hunting by local residents on the oilfield roads could increase the mortality of polar bears that are onshore. All of the impacts described above are relevant to individual animals. It is unlikely these impacts would have a negative effect at the population level.

#### **4H.1.3.5 Threatened and Endangered Species**

Potential impacts to bowhead whale are limited to major spills, aircraft noise, and sea-lift activities. Potential loss of spectacled eider nests could result from habitat loss, alteration, or disturbance. There would be a loss of potential Steller's eider habitat from the ASDP Area.

### **4H.1.4 Social Systems**

#### **4H.1.4.1 Socio-Cultural Characteristics**

Potential impacts to subsistence harvest and use may cause stress and change in community social organization in the village of Nuiqsut and to a lesser degree in Barrow, Atqasuk, and Anaktuvuk Pass. To the extent that changes in community social organization occur, changes in community health and welfare may also occur. To the extent that they occur, these impacts would likely increase under FFD.

#### **4H.1.4.2 Regional Economy**

Adverse economic effects on subsistence harvesting activities could result from increased travel costs and increased travel times.

#### **4H.1.4.3 Subsistence Harvest and Uses**

Construction and operation of facilities and roads could affect availability of key subsistence resources by deflecting or displacing these resources from customary harvest locations. Access to subsistence resources could be affected by the perception of regulatory barriers; the reluctance to hunt and shoot firearms near industrial facilities, including pipelines; raised road berms; pipelines with snowdrifts in winter that hinder passage; and a preference for animals not habituated to industrial development. Indirect effects would include hunters going to other areas, resulting in increased effort, cost, and risks associated with traveling farther. The

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location of production facilities, pads, roads, and pipelines near Fish and Judy creeks and within the Colville River Delta would result in infrastructure close to important subsistence use areas for Nuiqsut.

#### **4H.1.4.4 Environmental Justice**

Disproportionate effects on minority populations include potential direct and indirect impacts related to subsistence harvest and use. Other impacts identified as potentially disproportionate include spill impacts and potential water quality, air quality, and aircraft noise impacts.

#### **4H.1.4.5 Cultural Resources**

Project facilities would be constructed within 1/4 mile of a cultural resource site and could result in direct effects including damage to or destruction of the resource. The integrity of subsurface, surface, and aboveground cultural resources could be affected by construction activities.

#### **4H.1.4.6 Land Use and the Coastal Management**

The proposed action and alternatives and FFD alternatives would result in an increase in the total number of acres developed for oil production within the Plan Area. Construction of facilities within the Fish Creek Buffer Zone would require an exception to the BLM stipulation for development. Development of facilities in the area near the Kogru River designated for no surface activities would require an exception from the surface use restrictions for this area. The BLM requires approval for additional development within Sensitive Areas and the Teshekpuk Lake Special Area. Rezoning of land under the NSB LMRs from Conservation to Resource Development would be required.

#### **4H.1.4.7 Recreation Resources**

Potential effects on recreation would be localized and not above current conditions.

#### **4H.1.4.8 Visual Resources**

Construction and operation would result in adverse effects on visual resources. Facilities and structures associated with operation would introduce contrast to the natural landscape. The presence of drill rigs, pipelines, communication towers, and aerial power lines would be the most noticeable effect of construction.

#### **4H.1.4.9 Transportation**

New roads would be added in the Plan Area for use by industry, local residents, or the public. There would potentially be secondary effects on wildlife, subsistence, and recreation from increased access.

## **4H.2 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

This section discusses the short-term effects of the potential use of the ASDP Area for oil and gas development and production activities versus the maintenance and enhancement of potential long-term productivity of the environmental resources of the Plan Area.

“Short-term” refers to the total duration of oil and gas development and production activities; “long-term” refers to an indefinite period beyond the termination of oil and gas production. The specific impacts vary in type, intensity, and duration, according to the activities occurring at any given time. Initial activities, such as seismic surveying and exploratory drilling, result in short-term, localized impacts. Development drilling occurs sporadically throughout the life of an oil or gas field, but also results in short-term, localized impacts. Activities during the production life of a field may result in chronic impacts over a longer period of time (25 to 35 years), potentially punctuated by more severe impacts as a result of accidental events such as spills. Facility abandonment is also a short-term activity with localized impacts. The impacts of the removal of gravel pads and

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roads may be longer lasting. Over the long term—several decades to several hundreds of years—many environmental conditions are expected to be restored to near pre-development conditions and productivity. (Gravel pads and roads may remain in place or be partially restored.) Most of the impacts described in Sections 4A, 4B, 4C, and 4D would be short-term, lasting through the duration of project construction, operations, and abandonment. Some impacts to the physical, biological, and social environment would remain after operations cease and abandonment has occurred. These impacts are described below.

#### **4H.2.1 Physical Environment**

Currently, there are no plans to remove gravel fill areas (pads, roads, and airstrips). These features could remain permanently in the physical environment. Gravel excavation areas would also remain. Areas of permafrost that are disturbed by project construction, operations, and abandonment could take many years to stabilize and return to pre-project conditions. Oil that is extracted would be permanently removed from the Plan Area. Any inadvertent effects on paleontological resources that occur during construction, operation, or abandonment would result in long-term impacts.

#### **4H.2.2 Biological Environment**

Vegetation and habitat that would be displaced by gravel extraction and fill placement may be permanently lost if gravel fill is not removed during abandonment. If gravel fill were to be removed, revegetation of extraction and placement areas to near pre-project conditions would require many years. The amount of permanent habitat loss, and the disturbances to fish and wildlife that would occur during project construction, operations, and abandonment, would have negligible effects on populations; therefore, these resources would not be expected to experience long-term effects.

#### **4H.2.3 Social Systems**

Subsistence use patterns could be affected for the long term by the proposed action and alternatives. If gravel roads and pads are left in place, they may be used over the long term by local residents for access to areas not previously accessible. If subsistence resources become more difficult to harvest for the short term, the subsistence lifestyle may experience changes that persist for a long term. Any inadvertent effects on cultural resources sites that occur during construction, operation, or abandonment would result in long-term impacts to those resources. Annual revenues and taxes resulting from oil development in the Plan Area would cease upon the conclusion of project operations. The loss of these economic benefits could have long-term impacts to the local and regional economy if they are not replaced by other resource development revenues.

### **4H.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

The term “irreversible commitment of resources” describes the loss of future options. This applies primarily to the effects of using non-renewable resources (for example, minerals or cultural resources) or to processes or factors (such as soil productivity) that are renewable over long periods of time.

The term “irretrievable commitment of resources” refers to the loss of production, harvest, or use of natural resources. For example, some or all of the timber production from an area is irretrievable when the area is converted to an agricultural field. The timber production lost is irretrievable, but the action is not irreversible; if the land use changes, timber production could resume.

#### **4H.3.1 Physical Environment**

Extraction of oil from the Plan Area would result in an irreversible commitment of resources. Any inadvertent effects on paleontological resources that occur during construction, operation, or abandonment would also result in an irreversible commitment of resources. Use of water during construction and operations would result in an

irretrievable commitment of resources until the sources are replenished by natural recharge or inflow. Gravel resources used for roads and pads would be irretrievable during the life of the project and would be irreversibly committed if abandonment does not include gravel removal.

#### **4H.3.2 Biological Environment**

Incidental or induced mortality of fish and wildlife resulting from project construction and operation, as well as any reduction in habitat value, could result in localized irretrievable commitment of these resources during the life of the project. The placement of fill for pads and roads would result in an irretrievable loss of vegetative production and habitat value related to the footprint areas during the life of the project. An irreversible commitment of these resources could result if fill remains in place upon abandonment. The proposed action or alternatives and FFD alternatives would not be expected to result in any other irreversible commitments of biological resources.

#### **4H.3.3 Socio-Cultural Environment**

Any inadvertent effects on cultural resources during construction, operation, or abandonment would also result in an irreversible commitment of resources. During the life of the project, subsistence harvesting and recreational use of areas occupied by facilities would not be possible, representing an irretrievable commitment of related resources. The current visual appearance of the Plan Area would be irretrievably altered during the life of the project by the presence of project infrastructure. Annual economic benefits that are realized during the life of the project would be irretrievably and irreversibly lost upon the completion of project operations.